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# Examining Whether Social Factors Affect Listeners Sensitivity to Talker-Specific Information During Their Online Perception of Spoken Words

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EXAMINING WHETHER SOCIAL FACTORS AFFECT LISTENERS' SENSITIVITY  
TO TALKER-SPECIFIC INFORMATION DURING THEIR ONLINE PERCEPTION  
OF SPOKEN WORDS

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Bachelor of Arts

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This thesis has been approved  
for the Department of PSYCHOLOGY  
and the College of Graduate Studies by

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**ABSTRACT**

M'Lennan and Luce (2005) found no significant cost associated with changing which talker produced a particular word from the first block of trials to the second (no talker effects) when participants responded relatively quickly (easy lexical decision), and that talker effects emerged when participants responded relatively slowly (hard lexical decision). In a lexical decision task, participants hear words and nonwords and reaction times to correct responses are measured. In the current study, we examined whether social factors would lead to talker effects in an easy lexical decision task. In Experiment 1, participants were told that they have a chance to be part of a desirable high achieving group if they performed with high accuracy. Based on previous time-course findings, we predicted that talker effects would emerge in the current experiment, given that participants' attention to accuracy was expected to slow processing. Participants on the contrary sped up. We successfully demonstrated that group belonging is a sufficiently strong prime to alter the way participants perform in this task. In Experiment 2, participants (all males) were told that they would have the opportunity to meet the two talkers (one male and one female) they would hear during the experiment at the end. Moreover, participants were given some (fabricated) background information about the talkers, including mention that the female is attractive and the male is unattractive. Based

on previous findings in social psychology, we predicted that the male participants would attend more to the female's voice than to the male's voice. We demonstrated that the female serves as a more effective prime for words later spoken by both the same female talker, and also by the male talker. Examining the relationship between social factors and talker effects should lead to improved models of spoken word recognition, and provide important new insights into how listeners perceive spoken words in various social contexts.

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## **CHAPTER I**

### **INTRODUCTION**

#### **Social Factors**

Individuals have a fundamental need to belong to a group in order to feel validated and to decrease levels of uncertainty. Individuals look to others for understanding, to feel connected, and to ensure that they are living in a manner that is consistent with their culture's group norms. Humans have a natural desire to create bonds, find food and shelter, provide protection, and procreate. Previous research demonstrates that these processes occur naturally as individuals strive to belong to groups (Baumeister & Leary, 1995). Evolutionary psychologists stress that social bonds are imperative to a healthy functioning adult. If our ancestors did not form social bonds, they would not have been able to survive and protect themselves or obtain food and shelter. They would not have been able to procreate and therefore would have lived a life in solitude and died off. Therefore, the human gene pool now favors those who are more social animals, who typically have a greater desire to belong to groups and seek a more fulfilling life with social bonds. In fact, even primates demonstrate that the formation of social bonds is adaptive. A longitudinal study of nonhuman primates shows that the

females who were more social (defined as grooming one another, sitting in close proximity, assisting one another in coalitions) had healthier offspring (Silk, Alberts, & Altmann, 2003).

Similarly, in situations where an individual has experienced a trauma or sickness, it is more advantageous to one's well-being to have social support. In a study conducted with breast cancer survivors, social support was found to be significantly related to resourcefulness, self-esteem and overall well-being (Dirksen, 2000). Even after a surgery (e.g., knee replacement), those who had more social support (e.g., more visitors) had a more positive rehabilitation experience (i.e., had a more positive outlook, less negative thoughts to report, and healed at a quicker rate than their counterparts). Although these things (e.g., surgery, cancer, protection, work, etc.) may not initially make someone feel as though they need a group or social bond, being with others appears to be an instinctual need or desire, albeit this need or desire may be nonconscious.

As individuals form groups, they develop a sense of identity and self-worth and, depending upon how strongly they feel towards that group (or identify with that group), they may go to extremes to seek and maintain approval. Previous research shows that when a group identity is salient, the individual will conform to the characteristics or norms of that particular group (Turner, 1991). One can attribute these natural behaviors of conformity to the fundamental need to belong, which has been stated to be a part of a human's natural well-being and important for healthy functioning throughout life (Mellor, Stokes, Firth, Hayashi, & Cummins, 2008).

Another explanation of why individuals conform is to avoid possible ostracism (being ignored or excluded), which can be detrimental and extremely painful (Williams, 2001).

In fact, individuals go to great lengths to ensure that they will not be ostracized from a group, such as conforming to and becoming malleable through drastic measures. Asch (1952) demonstrated the great lengths that people will go to in order to avoid ostracism in his classic study on conformity. Individuals provided an incorrect answer to what they thought was a simple vision test where they needed to determine which line best matched the comparison line. Most individuals conformed and shaped their answer to mimic (or match) the confederate in the study, simply to avoid being the outsider in the group.

Indeed, individuals' fundamental need to belong to groups leads to the development of social identity. Social identity is constructed through perceived membership in social groups in which an individual feels a sense of connection with that group (Chen & Xin Li, 2006). Individuals may also feel a strong desire to belong to a group or affiliate (attaching oneself in close connection with that group) in order to display competence. Research shows that the need to affiliate is so strong that if the individual's preferred candidate loses an election, he or she will very quickly remove oneself as a member of that group (i.e., take down associated yard signs, bumper stickers, etc.) so that they will not be viewed collectively as a part of that group in a negative way (Boen et al., 2002). Likewise, after successful sporting events, individuals are more likely to wear the winning team's colors to *bask in reflected glory (BIRG)* (Cialdini et al., 1976). BIRG can be defined as feeling associated in some way or sharing the success of a group or individual even when not directly linked to the success of that group or individual. This phenomenon is even more likely to occur when an individual desires the status (i.e., higher status than that individual) of the successful other. Individuals want to project their status to signal to others that they are worthy and desirable. Therefore, individuals with a

higher status are more likely to be accepted by others, as those others desire that same form of status and power. The study on sports teams also demonstrated that participants were more likely to use the pronoun “we” more after their school’s football team had won. The concept of BIRG is strengthened as one desires to project their status (i.e., “*Our* team won”, wearing team colors, screaming loudly after a game in excitement to bring attention to oneself, etc.). If one seeks the endorsement of others (especially if they are considered high-need or have a low self-esteem in which they will desire belongingness to a greater extent), the BIRG concept will motivate and guide behavior at a more heightened level. This concept is believed to be a fundamental nonconscious, or natural, drive as one becomes more malleable to fit into the mold of others.

Introducing the idea of politics, and keeping in mind the ideas of status, power and the desire to affiliate, politicians who more frequently use the term “we”, unite individuals together into believing that there is a sense of unity. In fact, many individuals want to be a part of a successful political party so much that they will perhaps change their normally salient and hard faceted views just so they can belong to the majority group. A case study performed by Citrin (1990) revealed that individuals do not want to be viewed as racist (or having preconceived notions about someone based on outward appearance or previous assumptions). Individuals changed their stance to reflect that of the majority or winning politician when asked. More specifically, white voters provided inaccurate polling responses in fear that because they were not in favor of the black candidate, they would be viewed as a racist publicly (commonly referred to as The Bradley Effect after Los Angeles Mayor Tom Bradley, an African-American who lost the 1982 California governor's race despite being ahead in voter polls going into the

elections). Regardless of their statement that they simply did not care for the candidate regardless of race, they still had concerns that they would be viewed in a negative light. This finding is consistent with a more general phenomenon known as the social desirability bias, in that individuals want to be socially accepted and therefore respond in a way that they believe will conform to the majority (Boen et. al., 2002).

Shifting from politics to shopping habits, and still bearing in mind the need to belong, individuals will make unnecessary or expensive purchases in order to belong to desirable groups. Indeed, this need is so strong that customers will purchase products used by members of a group that they wish to be a part of. That is, their goal is to be part of this group, and therefore they will purchase a product connected to this desired group, in order to exhibit feelings of satisfaction that they in turn relate and attribute onto one's self (Hornsey & Jetten, 2004). Businesses and marketing campaigns recognize the strong need for acceptance into (or affiliation with) groups, and therefore target those who are in high need (or have a goal) to belong to a group for acceptance.

Another reason why individuals may strive to belong to a group is merely the natural drive to obtain goals. This process is especially heightened when the goal is attractive and desired by that individual (e.g., beneficial qualities such as money, a high grade, *acceptance into a desired group*<sup>1</sup>, increase in status, etc.). When the individual is motivated to obtain that goal, or even to avoid a certain goal, one's energy level (e.g. more attentional resources) increases in order to achieve a certain outcome (Wright, Toi, & Brehm, 1984).

Not only are these more natural entities of social belonging and affiliation determinants in attention and awareness, but one must also consider attraction and

motivation. Individuals are driven by the pursuit of the opposite sex<sup>2</sup>. Introducing the idea of attraction and the strong motivation that can follow (especially in mate-search), males and females generally differ in what is attractive and desirable to them. Females typically view males as attractive if they have resources (i.e., if they have money, power, dominance, etc.). Males, on the other hand, typically view females as attractive when they are more youthful (therefore bearing in mind evolutionary theory and one's ability to become fertile) and physically attractive (Perlini, Marcello, Hansen, & Pudney, 2001). As Symons (1979) has stated, men desire a variety of sexual partners, making youth and sexual attractiveness desirable. This idea can quite possibly be explained through evolutionary reasoning as males are biologically wired and predetermined to impregnate as many women as possible, whereas females are more apprehensive about sexual encounters as they are only able to bear few children in their lives and therefore need to be selective in male sexual partners. A study conducted at the University of Florida demonstrated that seven out of ten males accepted a sexual advance when prompted by a "moderately attractive" female. This same study had males question females on the same college campus asking if they would be interested in "coming back to my apartment, hooking up, or getting together later", in which zero females responded "yes" to this sexual liaison (Clark & Hatfield, 1989).

Indeed, attractive others can alter the way one approaches a task, including performance on a normally easy task, especially so when they are seeking a mate. Quite simply the mere activation of mate-search concepts or goals can increase attentional resources to the attractive members of the opposite sex (Maner, Gailliot, Rouby, & Miller, 2007). For individuals who are seeking a mate, this activation of physically

attractive potential mate, predicted greater attentional resources to the attractive opposite sex.

Having established a clear foundation regarding social factors and individuals' natural desires to mimic, to belong to groups, motivation in attraction and more generally to want to be liked, we will now examine how such knowledge from social psychology can be applied to a particular area of research in cognitive science, namely, spoken word recognition.

### **Spoken Word Recognition**

Although listeners are confronted with numerous sources of variability in speech, such as changes in talkers, speaking rate, and emotional tone of voice, recognition of spoken words is typically quite fast and highly accurate (McLennan, 2006). The most widely studied source of variability is talker variability, one type of indexical variability. Indexical variability can be defined as variations in the way a word is spoken, whether due to different speakers, speaking rates, or affective states (Abercrombie, 1967; Pisoni, 1997). Many researchers (e.g., Church & Schacter, 1994) have used the concept of the long-term repetition priming paradigm as a way of examining the role that indexical variability plays in the listeners' perception of spoken words. This paradigm involves presenting participants with two separate blocks of spoken stimuli to which they must respond in some way (depending on the task). Typically a filler task (i.e., a math test, a picture viewing task, or some other unrelated task) is presented between the first and second blocks, which are referred to as the prime (or study) and target (or test) blocks, respectively. When words are repeated in the prime and target blocks participants are

typically more rapid or accurate in their responses, relative to new or non-repeated control words (i.e., words appearing only in the target block that had not been presented during the prime block), referred to as a repetition priming effect. If participants perform more slowly or with reduced accuracy because of different talkers between the first block and the second block, this is referred to as a talker effect.

Recent research by M<sup>c</sup>Lennan and Luce (2005) show support that abstract features, elements of speech that do not change or vary with a change of talkers (e.g., phonemes), tend to occur more frequently than specific elements (e.g., talker-specific details). As Tenpenny (1995) points out, abstractionist theories assert that spoken word input activates abstract lexical information only, and episodic information does not play a role in word recognition. In contrast, episodic approaches that suggest word identification relies primarily on specific words and posits that mental representations consist of episodic information. Previous work demonstrates that the role that talker variability plays in listeners' online perception of spoken words depends on how quickly listeners are processing the spoken words (M<sup>c</sup>Lennan & Luce, 2005). In particular, when processing is relatively slow (difficult, taxing task), talker effects emerge, consistent with episodic accounts. When processing is relatively fast (an easy task), priming is equivalent in same and different talker conditions, consistent with abstractionist accounts. Therefore, rather than debating between these two relatively extreme theories, we will focus on trying to understand the conditions in which listeners may or may not be sensitive to talker-specific information (M<sup>c</sup>Lennan, 2007).

The lexical decision task is a commonly used task in research on spoken word recognition. In a typical lexical decision task, participants hear words and nonwords



spoken over headphones and are instructed to decide on each trial whether they are hearing a real word or a nonword by pressing one of two buttons on a button box connected to a computer. In an easy version of the lexical decision task, it is easier for the participant to determine whether the stimulus is a real word or a nonword because the nonwords do not sound like real words. For example, if the speaker were to say “zayth”, the participant’s task of deciding word or nonword is relatively easy, and thus responses are relatively fast. It is easy to decide that it is a nonword. However, if the speaker were to say “bacov” (resembling the word “bacon”), it would typically take the participant a little longer (i.e., longer processing time) to realize that although it resembles a real word it is not truly a real word (e.g., it is a wordlike nonword). So, hard lexical decision tasks are harder to determine whether the stimulus is a real word or a nonword. Consequently, the processing speeds for easy lexical decision tasks should be faster than the processing speeds for hard lexical decision tasks. Crucially, this temporal difference has been found to affect not only the nonword trials, but also the word trials (e.g., McLennan, Luce, & Charles-Luce, 2003).

Recall that more abstract representations should affect listeners’ perception of spoken words more when processing is relatively fast, and more specific representations should affect listeners’ perception of spoken words more when processing is relatively slow. Therefore, in hard lexical decision tasks, talker effects (or attenuation of the priming effect when there is a change in talkers) are predicted, and in easy lexical decision tasks, equivalent priming in same and different talker conditions are also predicted.

## **Social Factors and Spoken Word Recognition**

Recall that individuals often nonconsciously mimic others around them in order to fulfill their need to belong, especially when they want to affiliate and establish a rapport. Previous research shows how mimicry has played an important role in survival and evolution, in that individuals rely on others as resources for food, knowledge, reproduction and communication (Lakin, Jefferis, Cheng, & Chartrand, 2003). Mimicry can be defined as the inclination to adhere to mannerisms and postures, of those around them, even nonconsciously (Chartrand & Bargh, 1999).

Talkers will adjust their voice onset time (VOT) in their own shadowing responses toward those of the spoken models (Fowler et. al., 2003). VOT can be defined as the length of time between when a stop consonant is released and when the vibrations of the vocal folds begin. Importantly, although it is possible for people to purposely mimic others in some ways, it is nearly impossible to imitate vocal folds. This VOT finding demonstrates that mimicry can indeed occur on a nonconscious level (Pardo & Remez, 2006). Talkers will also converge in conversational sessions (Giles, Coupland, & Coupland, 1991), and even change the way they produce words by imitating the speaker during a shadowing task (even when they are not trying to, not instructed to, and are unaware they are doing so). For example, acoustic parameters of shadowed speech to baseline speech demonstrate that the shadowers tended to imitate in both fundamental frequency and word duration (Goldinger, 1998).

Individuals automatically or nonconsciously mimic many different aspects of communication, such as speech patterns, facial expressions, emotions, moods, postures, gestures, and mannerisms (Chartrand & Bargh, 1999; Lakin et. al., 2003). Another

finding showed that individuals will even mimic speech rhythms and accents nonconsciously as each individual is communicating with others in everyday speech, as well as in laboratory settings (Giles & Powesland, 1975). Webb (1969; 1972) found that individuals even change their rate of speech in conversational settings without their awareness. In a study by Delvaux and Soqueet (2007), participants were asked to repeat several sentences. Participants heard a recording that was presented in a different accent than their own and toward the end of this experiment participants were manipulating their voices to mimic the accent they previously heard in the recording. However, the participants reported that they were completely unaware of their imitating behavior.

Indeed, individuals nonconsciously mimic others around them, especially when they want to affiliate and establish a rapport, when producing spoken words. When likelihood of success is attainable and success is modest, desire for achievement and motivation to map out one's intellectual abilities are highest. Individuals have a natural desire to compare oneself to others and to feel validated by comparing their strengths and weaknesses according to similar individuals (Trope & Brickman, 1975). This observation was found in a task where difficulty was manipulated between easy and moderately difficult tasks and therefore attainable. If a task is out of reach, individuals will not exert effort in trying to complete the task at hand. Typically a difficult task that is unattainable would cause individuals to "give up". However, when a goal is reachable, individuals will be motivated to try their hardest and will therefore compare themselves in order to feel authenticated.

As discussed, according to previous research, individuals have a natural drive to want to belong. Thus, the current study set out to examine talker effects as participants

strive to belong to a particular group (Baumeister & Leary, 1995). Recall that previous research demonstrates that when individuals are performing an easy lexical decision task talker effects fail to emerge. However, *no study to date had examined whether social factors may influence listeners' sensitivity to talker-specific details during online spoken word recognition.*

In the current study, we conducted two experiments to examine whether participants' performance in an easy lexical decision task would be affected simply by providing some misleading information that the social psychology literature tells us should affect participants' behavior. According to this literature and the results found in McLennan and Luce (2005), the predictions were as follows: Individuals who believed they had a chance to be part of a desirable group (Experiment 1) would perform the easy lexical decision task more slowly (if accuracy is emphasized), which in turn would lead to talker effects. Furthermore, participants (all males) who believed they would meet the talkers (Experiment 2) were expected to pay greater attention to the female talker, and therefore would be more likely to show greater priming effects when primed by the female than the male talker. Consequently, talker effects were predicted in both experiments, albeit for different reasons. In Experiment 1, the social desirability instructions were expected to slow processing, and previous research had already demonstrated that talker effects were more likely when processing was relatively slow (new). The novel contribution here is the demonstration that social desirability can be one factor that can cause slow processing, and in turn influence listeners' sensitivity to talker-specific details during their online perception of spoken word recognition. More specifically, processing speed and attention are the underlying proximal mechanisms that

are affected by these distal social factors (i.e., instructions), which lead to stronger talker effects. Monetary incentives, a gender decision task during the prime block, and other social and cognitive factors may also lead to stronger talker effects. Nevertheless, our focus in the current experiment is on the need to belong.

In Experiment 2, telling participants that they will meet the talkers was expected to result in their paying greater attention to the talkers. Moreover, the nature of the descriptions of the talkers (described in more detail in the methods section for Experiment 2) was expected to result in the (all male) participants paying even greater attention to the female talker compared to the male talker. Note however that participants were not necessarily expected to perform the task relatively slowly in that both speed and accuracy were expressed in the instructions. Therefore, the novel contribution here is the demonstration that the expectation of meeting the talkers, coupled with the particular descriptions of the talkers, can influence listeners' sensitivity to talker-specific details during their online perception of the spoken words. That is, based on previous research, talker effects were predicted in male participants who believed they would be meeting the female speaker as they paid greater attention to the female's voice and were engaged in goal-oriented behavior (Festinger, 1957).

## **CHAPTER II**

### **EXPERIMENT 1: HIGH ACHIEVING GROUP**

The present study used an easy lexical decision task. Recall that according to previous work with this task, participants should complete the task relatively quickly, and thus talker effects should fail to emerge. However, in the current study, ostensible instructions regarding the social setting were thought to increase the likelihood of obtaining talker effects, despite the use of the easy lexical decision task. In Experiment 1, the participants were told that if they performed at a certain level they would have an opportunity to have their data included as part of a high achieving group and if not, their data would have to be discarded. Previous time course work demonstrates that no talker effects occur when this easy lexical decision task is performed without such information about a high achieving group. The stress on group belonging was expected to lead to talker effects. In other words, when more attention is focused on accuracy or performing sufficiently well to be included in a high performing group, reaction times (RTs) should be relatively slow, despite the use of the easy lexical decision task, and therefore talker effects are expected to emerge.

## **Method**

### **Participants**

Seventy-two participants from the Cleveland State University community were recruited to participate in Experiment 1. Participants were primarily Psychology 101 students who received credit toward the partial fulfillment of a course requirement. Participants from other classes also participated for extra credit. All seventy-two participants were right-handed native speakers of American English with no reported history of speech or hearing disorders.

### **Materials**

The exact same auditory stimuli used in Experiment 2A of McLennan and Luce's (2005) study were used in the current study. These stimuli consist of 24 monosyllabic target words and 24 unwordlike nonwords. See Appendix A for a complete list of stimuli<sup>3</sup>. The mean log frequency of occurrence for the target stimuli was 1.54 (Kucera & Francis, 1967). Talker PL produced the stimuli with a mean duration of 409ms. Talker TA produced the stimuli with a mean duration of 337ms. This variance demonstrates the differences in the talker's natural speaking rates and in order to keep the study as similar as possible to McLennan and Luce's (2005) study, no attempt was made to equate the duration differences. Therefore, we expect slightly faster reaction times to the words spoken by the female due to these natural shorter durations.

## **Design**

Auditory stimuli were presented in two blocks: a prime block followed by a target block. Participants heard a series of 24 items (12 words and 12 nonwords) in both blocks. A 2 (talker during the target block) X 3 (prime type) completely within-participant design was used. Orthogonal combination of the talker during the target block (male or female) and three levels of prime (match, mismatch, and control), resulted in the six conditions shown in Table 1.

The composition of the prime block was as follows: 8 target words, 8 nonwords, and 8 control stimuli (4 words, 4 nonwords). The target block consisted of 24 item trials, 12 words and 12 nonwords. In the target block, 8 stimuli matched, 8 mismatched, and 8 were controls.

## **Procedure**

Upon arrival to the laboratory, each participant read through and completed several informed consent forms, which are included in Appendix C. Participants were given the Edinburgh Handedness Inventory (Oldfield, 1971) and were asked several questions concerning their demographic information, which are included in Appendices D and E, respectively. The Edinburgh Handedness Inventory is used to determine whether a participant is left- or right- handed or ambidextrous<sup>5</sup>.

Participants first read through the instructions on the screen (included in Appendix F) and then completed a short practice block of lexical decision trials. Participants were then given fabricated feedback to show that they were performing slightly below average and that they should exert more effort to ensure that they would be considered for the high achieving group. Participants then began the prime block,



followed by a 5-minute filler task (math test), followed by the target block. In both the prime and target blocks participants were given a lexical decision task. Participants were asked to make a correct response as quickly and accurately as possible. The trials were timed and if no response was made within 5 seconds, that particular trial was recorded as an incorrect response and the next trial was then presented. Reaction time (RT) in milliseconds (ms) was measured from the onset of the auditory stimulus word or nonword (beginning of the stimulus) to the onset of the participant's button press.

After completing the main experiment, participants were instructed to complete a post experiment questionnaire, which consisted of open-ended questions. This questionnaire was presented on the computer screen without a time limit. They were asked what they thought the purpose of the experiment was to determine if their RTs were affected by any possible prior knowledge of the experiment. Finally, participants completed a questionnaire to determine their need to belong, need for affiliation and level of social competence (performed on the computer), included in Appendix G. Individuals were then be debriefed and given a copy of their consent form.

### **Results Experiment 1**

Any participant whose overall mean PC that fell two standard deviations beyond the grand means was excluded from the RT (but not the PC) analyses, resulting in the elimination of two participants. Moreover, missing cells in the RT data (which would occur if a given participant made errors to both of the trials in a given condition) were replaced with the mean RT for that particular condition, resulting in six replacements (i.e., 2% of the mean RTs). A 2 (talker during the target block: male or female) X 3 (prime type: match, mismatch, control) completely within-participants ANOVA was

performed on mean RTs to correct responses. See the top panel of Table 2 for the RT results from Experiment 1.

Because RT distributions are typically positively skewed, RT data violate the assumption of having a normal distribution expected when using ANOVA. Consequently, in the following statistical analyses of RT, the suggestions of Whelan (2008) were followed and data transformations of the raw RT data were used. In particular, all of the following statistical analyses reported for RT (for both Experiments 1 and 2) are from log transformed data, but the raw RTs are used in the tables to facilitate interpretation of the results.

The design of the current experiments used counterbalanced lists, such that each item appeared in every condition. Consequently, performing traditional ANOVAs with items as random factors was not justified for the current experiments (see Raaijmakers, Schrijnemakers, & Gremmen, 1999; Raaijmakers, 2003). Nevertheless, given that the design of our experiments included counterbalanced lists, such that each of the test items appeared in every condition, two dummy variables representing allocation of participants to experimental lists were included in the ANOVAs (for RT and PC, and in both Experiments 1 and 2). Because these dummy variables were included solely to reduce the estimate of random variation (see Pollatsek & Well, 1995), effects involving the dummy variables are not reported.

The main effect of talker was significant,  $F(1, 64) = 15.95, p = .001, \eta^2 = .199$ . ( $\eta^2$  refers to partial eta squared, a measure of effect size in which .02, .05, and .08 are typically associated with small, medium, and large effect sizes, respectively) (see Cohen, 1988). As predicted, participants responded more quickly to the stimuli produced by the

female talker than the male talker, presumably due to the differences in stimulus durations. However, the main effect of talker is theoretically uninteresting. The main effect of prime type was also significant,  $F(2, 128) = 3.77, p = .026, \eta^2 = .056$ . Although the prime type by talker interaction failed to reach significance,  $F(2, 128) = 1.67, p = .192, \eta^2 = .025$ , given that the pattern of RTs in the two talker conditions clearly differed (see the top panel of Table 2), two independent ANOVAs were performed to evaluate the pattern of priming separately for each of the two talkers.

For the male targets, the main effect of priming was not significant,  $F < 1.0$ . However, for the female targets, the main effect of priming was significant,  $F(2, 134) = 4.05, p = .020, \eta^2 = .057$ . Moreover, planned comparisons based on the main effect of prime type revealed that the magnitude of the priming effect (hereafter referred to as the MOPE), which is the difference between the match and control conditions, was significant,  $p = .018$ , but that the magnitude of the talker effect (hereafter referred to as MOTE), which is the difference between the match and mismatch conditions, was not significant,  $p = .366$ . However, an alternative method of evaluating the priming effectiveness of the match and mismatch conditions is to examine whether or not each of these two conditions resulted in a significant priming effect, relative to the control condition. Although the MOPE for the match condition was significant, as just reported, the MOPE for the mismatch condition did not approach significance,  $p = .604$ . We also directly compared the effectiveness of the match and mismatch conditions. That is, for the female targets, we directly compared the MOPE in the match condition (i.e., match RT minus the control RT) to the MOPE in the mismatch (i.e., mismatch RT minus the control RT) condition using a paired sample  $t$ -test, which revealed a (marginally)

significant effect,  $t(69) = -1.59, p = .058$ , providing statistical support for a (marginally) significant priming advantage (i.e., faster) in the match relative to the mismatch condition.

We also examined the percent of correct (PC) responses. Although the prime by talker interaction was not statistically significant,  $F < 1.0$ , given that the pattern of PCs in the two talker conditions differed (see the bottom panel of Table 2), two independent ANOVAs were performed to evaluate the pattern of priming separately for each of the two talkers.

For the female targets, the main effect of priming was not significant,  $F < 1.0$ . However, for the male targets, the main effect of priming was marginally significant,  $F(2, 138) = 2.83, p = .063, \eta^2 = .039$ . Moreover, although the MOPE for the match condition failed to reach significance,  $p = .141$ , the MOTE was marginally significant,  $p = .075$  (and the MOPE for the mismatch condition did not approach significance,  $p > .9$ ). Once again we directly compared the effectiveness of the match and mismatch conditions. That is, for the male targets, we directly compared the MOPE in the match condition (+6%) to the MOPE in the mismatch (-1%) condition using a paired sample  $t$ -test, which revealed a significant effect,  $t(71) = 2.30, p = .012$ , providing statistical support for a significant priming advantage (i.e., more accurate) in the match relative to the mismatch condition.

## **Discussion**

The main issue under investigation was whether or not talker effects emerge during online spoken word recognition tasks where individuals believe they are trying to become a part of a high achieving group in a task where talker effects are normally not obtained. We examined the need to belong to a high performing group. We expected to find individuals wanting to belong to this group, and would therefore slow down in order to perform more accurately on the task at hand (an easy lexical decision task). Consequently, we expected significant talker effects to emerge as a result of the slowed processing, consistent with the time course hypothesis and previous research.

Overall, the results lead to the conclusion that the experiment was partially successful. Here is how we failed: We did not actually slow the participants down by this instruction. In fact, if anything, participants actually sped up in their reaction times compared to McLennan and Luce (2005) (e.g., the overall mean RT in their Experiment 2A was 773 ms, compared to the current study –an almost identical replication – in which we obtained an overall mean RT of 686 ms). Here is how we succeeded: Having participants focus on the need to belong affected their performance in this task. Again, it appears that they performed more quickly (although we are not directly comparing RTs in the current experiment to the RTs in McLennan and Luce, 2005, there was at least a trend in this direction). Furthermore, and more importantly, their attention to the task produced a pattern of talker effects (manifested in RTs for the female talkers and PCs for the male talkers) not obtained by McLennan and Luce (2005) in their easy lexical decision task (their Experiment 2A), despite the fact that this was an almost identical

replication. In particular, having participants focus on the need to belong apparently resulted in their devoting more attention to the task, which in turn resulted in greater attention to the talker-specific details of the spoken word stimuli.

## **CHAPTER III**

### **EXPERIMENT 2: ATTRACTIVE FEMALE**

Experiment 2 was identical to Experiment 1, with the following exceptions: All participants were male, and rather than emphasizing accuracy in order to be included in a high achieving group, the social factor introduced was about meeting the talkers from the experiment. Participants were told that they would have the opportunity to meet the talkers from the experiment and were given descriptions of the talkers, including the attractive female (e.g., she is young, ambitious, athletic, eats healthy, models, high GPA, etc.). See Appendix H and I for biographies on the talkers and for the instructions that was provided at the beginning of the experiment, respectively. Participants also received fabricated information about the male speaker, which was presented in a non-competitive way. If the male were portrayed as having high status (e.g., rich, powerful, dominant), it would have introduced other variables, such as competitiveness, and thus would have interfered with our goal of focusing participants' attention on the female talker (Perlini, Marcello, Hansen, & Pudney, 2001). The instructions were expected to motivate the (all male) participants by introducing ideas of attractiveness and the opportunity to meet this attractive other, and therefore the male participants were expected to pay greater attention

to the female talker, which in turn should lead to greater attention to the talker-specific details of the words spoken by the female talker.

## **Method**

### **Participants**

A new sample of 37 participants was recruited from Cleveland State University meeting the same criteria as in Experiment 1; however, only males were used in Experiment 2<sup>6</sup>.

### **Materials**

The same stimuli presented in Experiment 1 were used for Experiment 2. Again, a complete list of stimuli is included in Appendix A.

### **Design**

The same 2 (talker during the target block) X 3 (prime type) completely within-participants design used in Experiment 1 was used in Experiment 2. However, what differed was the ostensible information that they would meet the talkers, and the corresponding descriptions of the talkers.

### **Procedure**

The procedure was identical to those described previously in Experiment 1 except participants did not receive any ostensible feedback in the middle of the experiment. Instead, they first read through a cover story stating general background information on the male and female speakers they believed they were going to be meeting and would hear over the headphones. The cover story painted a pleasant picture of the female, describing her as an attractive female (e.g., she is young, ambitious, a cheerleader, homecoming queen, athletic, eats healthy, models, high GPA, etc.). The cover story also



described the male speaker; however, a more unpleasant picture was painted, describing him as unattractive, and implying that he does not have a high status, which should have minimized competitiveness (e.g., the male speaker is an undergraduate student with an undecided major, likes to play video games, unemployed, etc.). The participants were then presented with instructions on the screen. See Appendix H for a complete description of the talkers. Participants were debriefed after the experiment and told that they would not be meeting the speakers.

## **Results Experiment 2**

As in Experiment 1, any participant whose overall mean PC fell two standard deviations beyond the grand mean was excluded from the RT (but not the PC) analyses, resulting in the elimination of one participant. Moreover, missing cells in the RT data were replaced with the mean RT for that particular condition, resulting in two replacements (i.e., 2% of the mean RTs).

A 2 (talker during the target block: male or female) X 3 (prime type: match, mismatch, control) completely within-participants ANOVA was performed on mean RTs to correct responses. There was no main effect of talker,  $F < 1.0$ . There was however a significant main effect of prime type,  $F(2, 60) = 4.28, p = .018, \eta^2 = .125$ . Although the prime type by talker interaction effect failed to reach significance,  $F(2, 60) = 1.98, p = .147, \eta^2 = .062$ , given that the pattern of RTs in the two talker conditions clearly differed (see the top panel of Table 3), and that the main purpose of the current experiment was to compare priming effects for the male and female talkers, two independent ANOVAs were performed to evaluate the pattern of priming separately for the two talkers.

For the male targets, the main effect of priming was not significant,  $F(2, 66) = 1.76$ ,  $p = .179$ ,  $\eta^2 = .051$ . However, for the female targets, the main effect of priming was significant,  $F(2, 66) = 3.52$ ,  $p = .035$ ,  $\eta^2 = .096$ . Planned comparisons based on the main effect of prime type revealed that neither the MOPE for the match condition nor the MOTE reached significance,  $p = .102$  and  $p = .118$ , respectively. The MOPE for the mismatch condition did not approach significance,  $p > .9$ .

Because the female talker appeared to serve as a more effective prime, we performed a paired  $t$ -test directly comparing the two primed conditions in which the female talker served as the prime (i.e., see the F-M and F-F in the top panel of Table 3) with the two primed conditions in which the male talker served as the prime (i.e., see the M-F and M-M in the top panel of Table 3). This analysis provides statistical support that the female talker did indeed serve as a more effective prime – for both female and male targets (751 and 798 in reaction times respectively),  $t(35) = -1.71$ ,  $p = .048$ . Two additional paired  $t$ -tests provide further statistical support. First, the MOPE for the mismatch condition did not approach significance for the female targets (i.e., M-F, -25.98),  $t < 1.0$ , consistent with the planned comparison based on the overall main effect of prime type for the female targets in the ANOVA. Second, the MOPE for the mismatch condition for the male targets (i.e., F-M, -85.68) was significant,  $t(35) = -2.13$ ,  $p = .02$ .

As in Experiment 1, we also examined the percent of correct responses. However, unlike Experiment 1, there was no indication that the MOTE was manifested in RT. There was a main effect of talker only for the females and in PC only for the males,  $F(1, 31) = 5.60$ ,  $p = .024$ ,  $\eta^2 = .153$ , demonstrating that they were more accurate to males in the target block. There was also a main effect of prime type,  $F(2, 62) = 4.26$ ,  $p = .018$ ,

$\eta^2 = .121$ . There was no prime type by talker interaction,  $F < 1.0$ . Planned comparisons based on the main effect of prime type revealed a marginally significant MOPE for the match condition,  $p = .079$ , and a significant MOTE,  $p = .015$ . The MOPE for the mismatch condition did not approach significance,  $p > .9$ .

## **Discussion**

The main issue under investigation is whether or not talker effects emerge during online spoken word recognition when male participants believe that they will meet the female speaker (who is attractive), using a task in which talker effects are normally not obtained. We expected to find male individuals wanting to meet this female speaker and to therefore demonstrate significant talker effects as they paid greater attention to the talkers, particularly the female talker.

Although we failed to obtain a significant talker effect in the overall ANOVA, we succeeded by demonstrating that the social information provided (i.e., the talkers' bios) changed the way participants performed the task. Moreover, we succeeded in demonstrating a pattern in line with social psychology, albeit somewhat different from what we had originally anticipated. At the outset of this study, we predicted that the male participants' greater attention to the female talker would lead to their paying greater attention to the talker-specific details of the words spoken by the female talker. However, what we found was that the words spoken by the female talker during the first block of trials served as more effective primes than the words spoken by the male talker during the first block of trials. So, rather than greater attention being paid to the talker-specific details of the words spoken by the female talker per se, what we found was evidence for the male listeners paying greater attention to the words spoken by the female

talker, presumably because the male participants believed they would be meeting the female talker. That is, perhaps the male participants were focused on the words in an attempt to have something to discuss with the female talker during their expected upcoming meeting. Although this is one possible account of the obtained data, this is purely speculation at this point and there are likely alternative accounts for why the words spoken by the female talker during the first block of trials served as more effective primes than the words spoken by the male talker during the first block of trials. Nevertheless, we can say decisively is that this effect was not observed in Experiment 1 or by McLennan and Luce (2005) in their easy lexical decision task (their Experiment 2A), despite the fact that this was an almost identical replication.

## **CHAPTER IV**

### **GENERAL DISCUSSION**

The main issue under investigation was whether or not talker effects would emerge due to simple instructions provided during online spoken word recognition tasks (e.g., social factors) where individuals believe they are trying to become part of a high achieving group (Experiment 1) or meeting an attractive female speaker (Experiment 2), in a task where talker effects had not previously been reported.

Experiment 1 examined the need to belong to a high performing group. We expected to find individuals wanting to belong to this group and therefore demonstrating significant talker effects as they aimed to excel and perform at their best ability. We expected participants would inherently slow down in order to perform more accurately in the task at hand (an easy lexical decision task). It was further expected that this would lead to greater effort by the participant, and thus relatively long reaction times. Interestingly, albeit unexpectedly, participants actually sped up in order to try and belong to this high achieving group. Nevertheless, in this easy lexical decision experiment, we obtained talker effects, which were manifested in RTs for the female targets and PCs for the male targets.

Experiment 2 examined spoken word recognition in male participants who were told that they would have the opportunity to meet the talkers, including an attractive female. The instructions presented general information about both talkers. It was stated that the “female is employed, sociable, and has certain admirable characteristics” (e.g., she is young, ambitious, athletic, cheerleader at CSU, eats healthy, models, high GPA). The male was described in an undesirable fashion. This should have eliminated ideas of competition ensuring that the male is no longer a threat to the male participant. Eliminating this competition variable helped to ensure that the male participants were now more focused on the attractive female talker they believed they were going to meet at the end of the experiment.

The current findings are informative to both the fields of spoken word recognition in cognitive psychology as well as social psychology. These results are informative to the field of social psychology by extending already established findings in this field and demonstrating that such effects can also play a role during listeners’ online perception of spoken words. Furthermore, these results inform models and theories of spoken word recognition by demonstrating that how the participant approaches the task may affect the likelihood that talker specific details will or will not affect listeners’ online perception of spoken words. The fact that we obtained talker effects in two experiments using an easy lexical decision task in which participants were responding relatively quickly challenges a strict time course hypothesis in which talker effects are only predicted to emerge when processing is relatively slow. Consequently, this study provides new evidence for another circumstance in which talker effects emerge. Moreover, our results suggest either that talker effects are not limited to a later episodic stimulus-response association and are

indeed associated with the mechanisms that ordinarily enhance word priming or that episodic stimulus-response associations are not limited to later processes typically involved with more effortful processing conditions (see Orfanidou et al., 2011).

Future work could extend the design of the current study in a number of ways. First, Experiment 1 could be extended by directly comparing talker effects in a group given instructions about a high achieving group (as in the current study) with a group not receiving such instructions (as in McLennan & Luce, 2005). Second, other criteria for earning a place in the high achieving group should modulate the likelihood of obtaining talker effects. For example, if ability to categorize words in a way that focuses listeners' attention to more abstract details (e.g., indicating on each trial whether the word had more consonants or more vowels), then talker effects should be attenuated. Third a variety of manipulations could be included to make the group more or less desirable, which in turn should make talker effects more or less likely. Fourth, providing photos of the talkers could modulate the effects obtained in Experiment 2. Fifth, the details about the talkers could be manipulated, such that the female is unattractive and/or the male is a competitor. Sixth, participants could either be all female or we could have a mixed group of both male and females. Finally, other social factors besides individual-group and goal-oriented behavior related to meeting talkers (e.g., ostracism, social comparison, competition, etc.) could be studied in relation to their role in listeners' online perception of spoken words. Clearly there are several ways to extend the current study. Nevertheless, not only are our current results informative to theories and models in two different areas of psychology, but the current study also represents an important first step into a new area of interdisciplinary scientific research.

## FOOTNOTES

<sup>1</sup>This particular example is the basis for the priming manipulation in Experiment 1.

<sup>2</sup>While this is not always the case, for purposes of our Experiment 2, we will only be interested in Heterosexual males who are interested in the opposite sex to observe the motivated nature of meeting the attractive female.

<sup>3</sup>Although future work could extend the current study to a new set of stimuli, we felt it was an important first step to use the same stimuli in order to more easily compare the results of the previous study to the current study (Experiment 1).

<sup>4</sup>PL is the male talker and TA is the female talker.

<sup>5</sup>Left-handers may represent and process language differently than right-handers, and thus left-handers and ambidextrous individuals were not included in the final set of participants.

<sup>6</sup>There were fewer participants in Experiment 2 than Experiment 1 due to the difficulty of obtaining a sufficient amount of male participants that met our other criteria. This is not all that surprising as there are typically more female students in psychology courses than males.



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Table 1

<i>Experimental Conditions and Examples of Primes and Targets</i>			
	<b>Condition</b>	<b>Prime</b>	<b>Target</b>
<b>Match</b>	<i>Primes and Targets: same words, same talker</i>		
	Word 1 <sub>m</sub> prime → Word 1 <sub>m</sub> target	Bacon <sub>male</sub>	Bacon <sub>male</sub>
	Word 1 <sub>f</sub> prime → Word 1 <sub>f</sub> target	Bacon <sub>female</sub>	Bacon <sub>female</sub>
<b>Mismatch</b>	<i>Primes and Targets: same words, different talkers</i>		
	Word 1 <sub>m</sub> prime → Word 1 <sub>f</sub> target	Bacon <sub>male</sub>	Bacon <sub>female</sub>
	Word 1 <sub>f</sub> prime → Word 1 <sub>m</sub> target	Bacon <sub>female</sub>	Bacon <sub>male</sub>
<b>Control</b>	<i>Primes and Targets different words completely</i>		
	Word 2 <sub>m/f</sub> * → Word 1 <sub>m</sub> target	Folder <sub>male/female</sub>	Bacon <sub>male</sub>
	Word 2 <sub>m/f</sub> → Word 1 <sub>f</sub> target	Folder <sub>male/female</sub>	Bacon <sub>female</sub>

\*A male spoke half of the control words and a female spoke half. The match or mismatch in talker is not important, given that what is crucial is the pairing of a particular word with a particular talker and all words in the control condition were unrelated words that were not repeated in the target block.

Table 2.

*The top panel is for RTs in Experiment 1; the bottom panel is for PCs in Experiment 1.*

	Match	Mismatch	Control	MOPE	Mismatch	MOTE
Male during Target	M-M 696.25	F-M 697.18	710.29	Match -14.04	Mismatch -13.11	-0.93
Female during Target	F-F 648.49	M-F 669.48	694.97	-46.48	-25.99	-20.99
Overall	672.37	683.83	702.63	-30.26	-19.30	-10.96

  

	Match	Mismatch	Control	MOPE	Mismatch	MOTE
Male during Target	M-M 96%	F-M 89%	90%	Match +6%	Mismatch -1%	+7%
Female during Target	F-F 88%	M-F 85%	86%	+1%	-1%	+3%
Overall	92%	87%	88%	+3%	-1%	+5%

Note: MOPE refers to the magnitude of the priming effect. The MOPE for the match condition is simply the RT (or PC) in the match condition minus the RT (or PC) in the control condition; The MOPE for the mismatch condition is simply the RT (or PC) in the mismatch condition minus the RT (or PC) in the control condition; MOTE refers to magnitude of talker effect, which is simply the RT (or PC) in the match condition minus the RT (or PC) in the mismatch condition.

Table 3.

*The top panel is for RTs in Experiment 2; the bottom panel is for PCs in Experiment 2.*

	Match	Mismatch	Control	MOPE	MOTE	
Male during Target	M-M	F-M		Match	Mismatch	
	781.10	754.42	840.10	-59.00	-85.68	+26.68
Female during Target	F-F	M-F				
	747.99	814.92	840.90	-92.91	-25.98	-66.93
Overall	764.54	784.67	840.50	-75.96	-55.83	-20.13

  

	Match	Mismatch	Control	MOPE	MOTE	
Male during Target	M-M	F-M		Match	Mismatch	
	99%	92%	93%	+5%	-1%	+7%
Female during Target	F-F	M-F				
	93%	86%	90%	+3%	-4%	+7%
Overall	96%	89%	92%	+4%	-2%	+7%

Note: MOPE refers to the magnitude of the priming effect. The MOPE for the match condition is simply the RT (or PC) in the match condition minus the RT (or PC) in the control condition; The MOPE for the mismatch condition is simply the RT (or PC) in the mismatch condition minus the RT (or PC) in the control condition; MOTE refers to magnitude of talker effect, which is simply the RT (or PC) in the match condition minus the RT (or PC) in the mismatch condition.



## APPENDICES

## APPENDIX A

### Stimuli List

Prime Block Words	Prime Block Nonwords*	Target Words	Target Nonwords
<i>leg</i>	<i>taZ</i>	<i>leg</i>	<i>taZ</i>
<i>bowl</i>	<i>TaS</i>	<i>bowl</i>	<i>TaS</i>
<i>nut</i>	<i>JWm</i>	<i>nut</i>	<i>JWm</i>
<i>key</i>	<i>DcG</i>	<i>key</i>	<i>DcG</i>
<i>bee</i>	<i>JUg</i>	<i>bee</i>	<i>JUg</i>
<i>cat</i>	<i>gRP</i>	<i>cat</i>	<i>gRP</i>
<i>book</i>	<i>JRg</i>	<i>book</i>	<i>JRg</i>
<i>bear</i>	<i>Yev</i>	<i>bear</i>	<i>Yev</i>
<i>deer</i>	<i>nWJ</i>	<i>deer</i>	<i>nWJ</i>
<i>nail</i>	<i>vOZ</i>	<i>nail</i>	<i>vOZ</i>
<i>fly</i>	<i>ZeD</i>	<i>fly</i>	<i>ZeD</i>
<i>car</i>	<i>FUp</i>	<i>car</i>	<i>FUp</i>
<i>hand**</i>	<i>tUz</i>		
<i>goat</i>	<i>TWJ</i>		
<i>heart</i>	<i>TWD</i>		
<i>hat</i>	<i>tWc</i>		

\*Note: The nonwords are written in “Klattese”, a form of phonetic transcription that uses standard computer keys, as opposed to IPA that uses special symbols. See the transcription guide provided in Appendix B.

\*\*The four final words and nonwords are control words that only appeared during the prime block.



APPENDIX C

Initial Paperwork

**PARTICIPANT INFORMATION FORM**  
**PAGE 1**  
**DR. CONOR T. M<sup>C</sup>LENNAN, ASSISTANT PROFESSOR AND DIRECTOR**  
**JESSICA NEWELL, GRADUATE STUDENT**  
**LANGUAGE RESEARCH LABORATORY**  
**CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY**  
**CHESTER BUILDING 32**  
**(216) 687-3834**

**FOR LRL USE:**  
Room # \_\_\_\_\_  
Participant # \_\_\_\_\_  
\_\_\_\_\_ (credits) OR \$ \_\_\_\_\_  
Experiment \_\_\_\_\_  
Date \_\_\_\_\_  
Experimenter \_\_\_\_\_

**Please fill in the following information:**

Name: \_\_\_\_\_

\* Address: \_\_\_\_\_  
\_\_\_\_\_

E-mail address(es): \_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_ Cell Phone Number: \_\_\_\_\_

Date of Birth: \_\_\_\_\_ Place of birth (City): \_\_\_\_\_

Gender: \_\_\_\_\_ Major: \_\_\_\_\_

Place of Longest Residence (City): \_\_\_\_\_

First language spoken: \_\_\_\_\_

Are you (circle one):    right-handed    left-handed    ambidextrous

What languages do you speak fluently? \_\_\_\_\_

Would you like to be added to (or remain on) our "Paid Participants Database" so that we can notify you in the future of paid experiments for which you are eligible to participate? \_\_\_\_\_  
\_\_\_\_\_

*\*Note: If you would prefer not to provide your full address and phone number(s), you may simply provide your zip code. Thank you.*

**PARTICIPANT INFORMATION FORM**

**PAGE 2**

**DR. CONOR T. M<sup>C</sup>LENNAN, ASSISTANT PROFESSOR AND DIRECTOR  
JESSICA NEWELL, GRADUATE STUDENT  
LANGUAGE RESEARCH LABORATORY  
CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY  
CHESTER BUILDING 32  
(216) 687-3834**

**FOR LRL USE:**

Room # \_\_\_\_\_

Participant # \_\_\_\_\_

\_\_\_\_\_ (credits) OR \$ \_\_\_\_\_

Experiment \_\_\_\_\_

Date \_\_\_\_\_

Experimenter \_\_\_\_\_

Please note that your responses to the following questions will *not* be directly linked to your name. As with any part of your experience as a research participant in our study, please feel free to ask the experimenter if you have any questions. Thank you.

Have you ever had a hearing or speech disorder?

(circle one)            YES      NO

If yes, please explain: \_\_\_\_\_

Have you ever had a visual or reading disorder (other than glasses/contacts)?

(circle one)            YES      NO

If yes, please explain: \_\_\_\_\_

Have you ever been diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD)?

(circle one)            YES      NO

If yes, please explain: \_\_\_\_\_

**PARTICIPANT CONSENT FORM: WORD RECOGNITION**  
**JESSICA L. NEWELL, GRADUATE STUDENT**  
**LANGUAGE RESEARCH LABORATORY**  
**CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY**  
**CHESTER BUILDING 32**  
**(216) 687-3834**  
E-MAIL: [language@mac.com](mailto:language@mac.com)  
WEBSITE: <http://web.mac.com/language@mac.com>

The purpose of this study is to fulfill the graduate thesis requirement for Jessica Newell, a graduate student at Cleveland State University.

There are two copies of this letter. After signing them, please keep one copy for your records and return the other one. Thank you in advance for your cooperation and support.

"I agree to participate in a perceptual experiment in which I will hear spoken words over headphones. I agree to respond to these sounds by pressing a response button. I understand that confidentiality of my identity will be maintained at all times.

I understand that the procedures to be followed in this experiment have been fully explained to me and that I may ask questions regarding the experiment at the end of the experimental session. I understand the approximate time commitment involved (30 minutes) and that I will receive 0.5 credit(s) for my participation. I am also aware that I may refuse to continue the experiment at any time and that I will be excused without loss of credit.

I understand that participation in this experiment involves no known risks greater than that occurring during the course of everyday living and that there are no direct benefits from participating in this study.

I understand that the purpose of this research is to add knowledge to the field of spoken word recognition. I understand that although there may be several indirect benefits of this study, its direct benefit is adding to the current body of knowledge on human perception.

I, the undersigned, am 18 years or older and have read and understood this consent form and hereby agree to give my consent to voluntarily participate in this experiment."

I understand that if I have any questions about my rights as a research subject I can contact the Cleveland State University Institutional Review Board at (216) 687-3630.

\_\_\_\_\_  
*Signature of Participant*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Name of Participant (PLEASE PRINT)*

\_\_\_\_\_  
*Signature of Researcher*

\_\_\_\_\_  
*Date*

## APPENDIX D

### Handedness Inventory

You can further help us by providing answers to the following questions. There are no right or wrong answers. Please indicate your preferences in the use of hands in the following activities by answering L for Left hand OR R for Right hand, OR X for No preference. After answering L, R, or X, please answer whether or not you ever use the other hand for each activity by typing Y for Yes OR N for No. Please answer all of the questions. If you have any questions, please ask the experimenter. Please type in your assigned ID number.

Which hand do you write with?  
L)Left R) Right X) No Preference  
Writing  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you draw with?  
L) Left R) Right X) No Preference  
Drawing  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you throw with?  
L)Left R) Right X) No Preference  
Throwing  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you use when using scissors?  
L)Left R) Right X) No Preference  
Scissors  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you put your toothbrush in?  
L)Left R) Right X) No Preference  
Toothbrush  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you use when using a knife without a fork?  
L)Left R) Right X) No Preference  
Knife  
Do you ever use the other hand?  
Y for Yes OR N for No

Which hand do you use when using a spoon?

L)Left R) Right X) No Preference

Spoon

Do you ever use the other hand?

Y for Yes OR N for No

Which hand is your upper hand when using a broom?

L)Left R) Right X) No Preference

Broom

Do you ever use the other hand?

Y for Yes OR N for No

Which hand do you use when striking a match?

L)Left R) Right X) No Preference

Striking a match

Do you ever use the other hand?

Y for Yes OR N for No

Which hand do you use when opening a lid to a box?

L)Left R) Right X) No Preference

Opening a lid to a box

Do you ever use the other hand?

Y for Yes OR N for No

Thank you! Please inform the researcher that you have completed this questionnaire.



## APPENDIX E

### Demographics Questionnaire

Your gender is:

- a.) Male
- b.) Female
- x.) Skip

Your ethnic background is:

- a.) Hispanic or Latino
- b.) Not Hispanic or Latino
- x.) Skip

Your racial background is:

- a.) American Indian/Alaska Native
- b.) Native Hawaiian or Other Pacific Islander
- c.) White
- d.) Unknown
- e.) Asian
- f.) Black or African American
- g.) More than One Race
- x.) Skip

Thank you! Please inform the researcher that you have completed the questionnaire.

## APPENDIX F

### Sample Instructions for Experiment 1

Language Research Laboratory  
Chester Building Room 32

Newell and M<sup>c</sup>Lennan Specificity Experiment Top Performers: Fall 2010

Welcome to the Language Research Laboratory. We appreciate your helping us today. You have been randomly selected to a particular group today. ***Your results of this experiment will only be considered and helpful to us if you are the top performer in your assigned group. Therefore, try your best in making quick and accurate decisions.***

In the experiment that you will be participating in today, you will hear spoken items over headphones. Some of the words will be real English words; some will be nonsense words. We want you to decide as quickly but as accurately as possible if each item is a real word in English OR a nonword by pressing one of the two appropriately labeled buttons on the response box in front of you.

A typical trial will proceed as follows: A spoken item will be presented over your headphones. As quickly as you can, press the GREEN button on the right if you think the item is a real word or the RED button on the left if you think the item is not a real word in English. Try to be as fast but as accurate as possible. As soon as you have responded, a new trial will begin.

Please rest your hands on the response box with your right thumb above the GREEN (word) button and your left thumb above the RED (nonword) button.

We will begin with a brief practice phase to familiarize you with the experiment.

***REMEMBER, Your results of this experiment will only be considered and helpful to us if you are the top performer in your assigned group. Therefore, try your best in making quick and accurate decisions. Therefore, please do your best to avoid making any mistakes.***

If you have any questions, please ask the experimenter now.

Let the experimenter know when you are ready to begin the experiment to ensure that all other participants are ready to begin as well.

Thank you.

## APPENDIX G

### Social Desirability Scale

**Instructions:** For each of the statements below, please rate on a scale of 1-5 how much you feel these statements apply to you in general: 1 being the lowest and 5 the highest.

1. = strongly disagree

2. = disagree

3. = undecided

4. = agree

5. = strongly agree

\_\_\_\_\_ 1. I was trying as hard as I could in this experiment.

\_\_\_\_\_ 2. It is important for me to do well.

\_\_\_\_\_ 3. Being competent is more important than being liked.

\_\_\_\_\_ 4. I need to feel that there are people I can turn to in times of need.

\_\_\_\_\_ 5. I want other people to accept me.

\_\_\_\_\_ 6. I do not like being alone.

\_\_\_\_\_ 7. Being apart from my friends for long periods of time does not bother me.

\_\_\_\_\_ 8. I have a strong desire to feel like I belong to groups.

\_\_\_\_\_ 9. It hurts me to be rejected by others.

\_\_\_\_\_ 10. It bothers me a great deal when I am not included in other people's plans.

\_\_\_\_\_ 11. My feelings are easily hurt when I feel that others do not accept me.

\_\_\_\_\_ 12. I feel lonely.

\_\_\_\_\_ 13. I like to be around others.

\_\_\_\_\_ 14. It does not bother me when I am not invited to an outing.

\_\_\_\_\_ 15. I have as many friends as I need.

\_\_\_\_\_ 16. I'd rather do things on my own.

\_\_\_\_\_ 17. I like to be unique.

- \_\_\_\_\_ 18. Being socially accepted by others is more important than being smart.
- \_\_\_\_\_ 19. I crave social interaction.
- \_\_\_\_\_ 20. I like to do things in a group versus by myself.
- \_\_\_\_\_ 21. I'd rather live alone than have roommates.
- \_\_\_\_\_ 22. I wish I had more friends in my life.
- \_\_\_\_\_ 23. I crave social approval.
- \_\_\_\_\_ 24. Being near others is important to me.
- \_\_\_\_\_ 25. Being smart and capable is more important than having others accept me.

APPENDIX H

Meet the talkers...

<p>Female Speaker <i>Amy S.</i></p>	<p>Male Speaker <i>John R.</i></p>
<p>Age: 19 GPA: 3.2</p> <ul style="list-style-type: none"> <li>• Works at a bar on W. 6th</li> <li>• Cheerleader at CSU</li> <li>• Voted by local magazine as “most attractive”</li> <li>• Running for Homecoming Queen at CSU – be sure to vote for Amy!</li> <li>• Lives on campus</li> </ul> <p><i>Interests:</i> Enjoys working out, eating healthy, hanging out with her girlfriends, being fashionable</p> <p><i>Self-description:</i> “I love my friends and family! I love being active and I love my cheerleader girlfriends! GO VIKES! I just love it here at CSU!”</p>	<p>Age: 35 GPA: 2.9</p> <ul style="list-style-type: none"> <li>• Undecided major</li> <li>• Currently unemployed</li> <li>• Lives at home</li> </ul> <p><i>Interests:</i> Enjoys video games, watching TV and eating good food, especially home made desserts</p> <p><i>Self-description:</i> “my life is World of Warcraft. ‘It’s not a game – it’s a world!!!!’ I am the head of the alliance on my guild and wish I could play 24/7.”</p>

## APPENDIX I

### Sample Instructions for Experiment 2

Language Research Laboratory  
Chester Building Room 32

Newell and M<sup>c</sup>Lennan Specificity Experiment Meet the Talkers: Fall 2010

Welcome to the Language Research Laboratory. We appreciate your helping us today.

In the experiment that you will be participating in today, you will hear spoken items over headphones. Some of the words will be real English words; some will be nonsense words. We want you to decide as quickly but as accurately as possible if each item is a real word in English OR a nonword by pressing one of the two appropriately labeled buttons on the response box in front of you.

A typical trial will proceed as follows: A spoken item will be presented over your headphones. As quickly as you can, press the GREEN button on the right if you think the item is a real word or the RED button on the left if you think the item is not a real word in English. Try to be as fast but as accurate as possible. As soon as you have responded, a new trial will begin.

Please rest your hands on the response box with your right thumb above the GREEN (word) button and your left thumb above the RED (nonword) button.

After the experiment, you will have the opportunity to meet the talkers from the experiment. We encourage you to be open and honest with the talkers on your thoughts about the experiment. They look forward to meeting you!

We will begin with a brief practice phase to familiarize you with the experiment.

If you have any questions, please ask the experimenter now.

Thank you.